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मानक

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IS 4277 (1975): Sunflower Oil [FAD 13: Oils and Oilseeds]



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“Knowledge is such a treasure which cannot be stolen”



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For Official Use

IS : 4277 - 1975

*Indian Standard*  
SPECIFICATION FOR SUNFLOWER OIL  
( *First Revision* )

UDC 665.347.8



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**INDIAN STANDARDS INSTITUTION**  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
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November 1975







## Representing

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AMENDMENT NO. 1      AUGUST 1989

TO

IS : 4277 - 1975 SPECIFICATION FOR  
SUNFLOWER OIL

( *First Revision* )

( *Page 4, clause 2.1.2* ) — Substitute the following for the existing clause:

**‘2.1.2 Refined Sunflower Oil** — Refined sunflower oil means oil which is obtained by expression or solvent extraction of sunflower oil bearing materials, deacidified either with alkali or physical refining or by miscella refining by bleaching with adsorbent earth and/or carbon and deodorized with steam.’

( *Page 5, clause 4.3* ) — Substitute the following for the existing clause:

**‘4.3 Admixture with Other Oils** — The material shall be free from admixture of other oils.

**4.3.1** The material shall be free from non-edible oils when tested according to 9, 10, 11, 12, 14, 15 and 16 of IS : 548 ( Part 2 ) - 1976\*.’

( *Page 5, clause 6.2* ) — Add the following after 6.2:

**‘6.2.1** The containers may also be marked with the Standard Mark:

NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or processors may be obtained from the Bureau of Indian Standards.’

\*Methods of sampling and test for oils and fats: Part 2 Purity test.

( CAFDC 5 )





**AMENDMENT NO. 2 MARCH 1989**  
**TO**  
**IS : 4277 - 1975 SPECIFICATION FOR**  
**SUNFLOWER OIL**

*( First Revision )*

[ Page 6, Table 1, Sl No. (ii), col 5 ] -- Substitute '30 $\frac{1}{2}$ ' for '25'.

( Page 6, Table 1 ) -- Insert the following foot-note at the end:

‡Measured in 1.4 in cell on the Lovibond scale expressed as Y+5R.\*

( CAFDC 5 )

Reference Copy (संदर्भ कापी)  
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AMENDMENT NO. 3 SEPTEMBER 1995  
TO  
IS 4277 : 1975 SPECIFICATION FOR SUNFLOWER OIL  
( First Revision )

( Page 3, Foreword, clause 0.4 ) — Add the following clause 0.5 after clause 0.4 and renumber the subsequent clause:

'0.5 A scheme for labelling environment friendly products to be known as ECO Mark has been introduced at the instance of the Ministry of Environment and Forests ( MEF ). The ECO Mark shall be administered by the Bureau of Indian Standards ( BIS ) under the BIS Act, 1986 as per the Resolution No. 71 dated 20 February 1991 as published in the Gazette of the Government of India vide GSR 85(E) dated 21 February 1991. For a product to be eligible for marking with the ECO Mark it shall also carry the Standard Mark of BIS for quality besides meeting additional optional environment friendly ( EF ) requirements. The EF requirements for sunflower oil are therefore being included through an amendment.

This amendment is based on the Gazette Notification No. 678 dated 30 August 1994 for Labelling Edible Oils, Tea and Coffee as environment friendly products, published by the Ministry of Environment and Forests.'

( Page 5, clause 4.4 ) — Add the following clauses after clause 4.4:

**4.5 Optional Requirements for ECO Mark**

**4.5.1 General Requirements**

4.5.1.1 The product shall conform to the requirements of quality prescribed under clauses 4.1 to 4.4.

4.5.1.2 The manufacturers shall produce to BIS environmental consent clearance from the concerned State Pollution Control Board as per the norms laid down under the Water ( Prevention and Control ) of Pollution ) Act, 1974; Air ( Prevention and Control of Pollution ) Act, 1981; Water ( Prevention and Control of Pollution ) Cess Act, 1977 respectively, along with the authorization, if required under the Environment ( Protection ) Act, 1986, while applying for ECO Mark.

**4.5.2 Specific Requirements**





**Amendment No. 3 to IS 4277 : 1975**

**4.5.2.1** The product shall not contain aflatoxin, more than 5 mg/kg, when tested by the method prescribed in Appendix A.

**4.5.2.2** The pesticide residues, if any, shall not exceed the tolerance limits as prescribed in the *Prevention of Food Adulteration Act, 1954* and Rules made thereunder.

**4.5.2.3** Only permitted antioxidants not exceeding the quantities specified against each as prescribed under the *Prevention of Food Adulteration Act, 1954* and Rules made thereunder, shall be used, if required.

**4.5.2.4** The product shall not contain any of the toxic metals in excess of the quantities prescribed in Table 2.

**TABLE 2 LIMITS FOR TOXIC METALS**

Sl. No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO
i)	Lead, mg/kg, <i>Max</i>	5.0	IS of IS 1699 : 1995*
ii)	Arsenic, mg/kg, <i>Max</i>	0.5	do
iii)	Cadmium, mg/kg, <i>Max</i>	1.0	do
iv)	Mercury (total) mg/kg, <i>Max</i>	0.25	do

\* Methods of sampling and test for food colours ( *second revision* ).

( Page 5, clause 5.1 ) — Add the following clause 5.1.1 after clause 5.1:

**5.1.1** For ECO Mark the product shall be packed in such packages which are made from recyclable ( that is which can be re-processed to manufacture any useful product ) or biodegradable materials.'

( Page 5, clause 6 ) — Add the following clause 6.1.1 after clause 6.1:

**6.1.1** For ECO Mark the containers shall be marked with the following information:

- List of identified critical ingredients in descending order of quantity, percent by mass, which shall include 'made from sunflower oil';
- The brief criteria for which the product has been labelled for ECO Mark; and
- Shelf life of the product."



(Page 7, clause 8.2) — Add the following Appendix after clause 8.2:

**‘APPENDIX A**  
(Clause 4.5.2.1)

**DETERMINATION OF AFLATOXIN**

**A-1 REAGENTS**

**A-1.1 Acetone, 70 Percent** — 700 ml acetone in 300 ml distilled water.

**A-1.2 Acetone, 20 Percent** — 200 ml acetone in 800 ml distilled water.

**A-1.3 Lead Acetate, 20 Percent** — 200 g neutral acetate in distilled water and 3 ml glacial acetic acid, diluted to one litre.

**A-2 PROCEDURE**

**A-2.1** Dissolve 30 g sample in 100 ml hexane.

**A-2.2** Extract with 3 × 50 ml 70 percent acetone.

**A-2.3** To the extract add 60 ml distilled water and 20 ml lead acetate.

**A-2.4** Boil to reduce volume to 150 ml. Cool to about 20°C.

**A-2.5** Filter and wash with 20 percent acetone.

**A-2.6** Extract filtrate and washings with 3 × 50 ml chloroform.

**A-2.7** Pass chloroform layer through anhydrous sodium sulphate.

**A-2.8** Concentrate to 50 ml and spot on TLC plate.

**A-3 CALCULATION**

$$\text{Aflatoxin, ng/kg} = \frac{V \times s \times 1000}{v \times m}$$

where

$V$  = volume of extract in ml,

$v$  = volume of extract giving minimum observable fluorescence in  $\mu\text{l}$ .

$m$  = mass of sample in g, and

$s$  = standard toxin giving minimum observable fluorescence in  $\mu\text{g}$ .

(FAD 44)

**AMENDMENT NO. 4 MARCH 2002  
TO  
IS 4277 : 1975 SPECIFICATION FOR SUNFLOWER OIL  
( First Revision )**

( Amendment No. 3, page 2, clause 4.5.2.1 ) — Substitute '5  $\mu\text{g/kg}$ ' for  
'5 mg/kg'.

( FAD 44 )

22 MAR 2002

Reprography Unit, BIS, New Delhi, India



*Indian Standard*  
SPECIFICATION FOR SUNFLOWER OIL  
( *First Revision* )

**0. FOREWORD**

**0.1** This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 25 September 1975, after the draft finalized by the Oils and Oilseeds Sectional Committee had been approved by the Chemical Division Council and the Agricultural and Food Products Division Council.

**0.2** This standard was first published in 1967 based on the results of analysis of sunflower oil at various laboratories on imported oil samples at the instance of the Directorate of Sugar and Vanaspati (Ministry of Agriculture, Government of India) in order to regulate the quality of the imported sunflower oil which is mostly used for edible purpose.

**0.3** In this revision the title of the standard has been modified. Now that indigenous production of sunflower seeds and oil has started, the concerned Sectional Committee desired to revise IS : 4277-1967\* to include raw as well as refined grades of oil. This revised specification has been prepared based on data made available by the Oil Technological Research Institute (OTRI), Anantapur (AP); Department of Applied Chemistry, Calcutta University, Calcutta; Central Food Laboratory, Calcutta; Regional Research Laboratory, Hyderabad; and Deputy Commissioner (Oilseeds), Ministry of Agriculture, Government of India. The assistance so derived is thankfully acknowledged.

**0.4** The production of sunflower seeds on commercial scale has started recently in the country. This standard is based on data available on various varieties of sunflower grown in different parts of the country at present. It is, however, likely that due to diverse climatic conditions in the country, there may be some variations in requirements like refractive index and iodine value. Even though care has been taken to specify larger range of these characteristics, the Committee responsible for the preparation of this standard would review the position for any modification when more data are available in due course.

**0.5** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance

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\*Specification for solvent extracted sunflower oil, refined.



with IS : 2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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## 1. SCOPE

1.1 This standard prescribes requirements and methods of sampling and test for sunflower oil.

## 2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given under 2 of IS : 548 ( Part I )-1964† and the following shall apply.

2.1.1 *Semi-refined Sunflower Oil* — Sunflower oil obtained by the process of solvent extraction which has been neutralized with alkali, without or with bleaching, with bleaching earth or activated carbon or both, no other chemical agent being used.

2.1.2 *Refined Sunflower Oil* — Sunflower oil obtained by the process of expression or solvent extraction which has been neutralized with alkali, bleached with bleaching earth or activated carbon or both, and deodorized with steam, no other chemical agent being used.

## 3. TYPES AND GRADES

3.1 The material shall be of the following types and grades:

- a) *Expressed Type*
  - i) Raw grade, and
  - ii) Refined grade.
- b) *Solvent-Extracted Type*
  - i) Raw grade,
  - ii) Semi-refined grade, and
  - iii) Refined grade.

3.1.1 Both grades of expressed type and refined grade of the solvent-extracted type are suitable for direct edible consumption.

3.1.2 The other grades of the solvent-extracted type are suitable for making *VANASPATHI* and refined oil only, and not for direct edible consumption.

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\*Rules for rounding off numerical values ( *revised* ).

†Methods of sampling and test for oils and fats: Part I Methods of sampling, physical and chemical tests ( *revised* ).

## 4. REQUIREMENTS

**4.1 Description** — The material shall be obtained from good quality sunflower seed cake or from undamaged, mature sunflower seeds from the plant *Helianthus annuus* Linn., fam. Compositae, by a process of solvent extraction or from sunflower seeds by a process of expression.

**4.1.1** Solvent-extracted oil shall be obtained from the oleaginous material using solvent hexane conforming to IS : 3470-1966\*.

**4.2** The material shall be clear and free from adulterants, sediment, suspended and other foreign matter, separated water, and added colouring and flavouring substances. When tested as prescribed in **20** of IS : 548 (Part I)-1964†, the material shall have peroxide value not more than 10 milliequivalents peroxide oxygen per kg of it and shall have acceptable taste and odour.

**4.2.1** The clarity of the material shall be judged by the absence of turbidity after keeping the filtered sample at 30°C for 24 hours.

**4.3 Admixture with Other Oils** — The material shall be free from admixture with other oils, when tested according to the methods prescribed in IS : 548 (Part II)-1974‡.

**4.4** The material shall also comply with the requirements given in Table 1.

## 5. PACKING

**5.1** The materials shall be supplied in suitably sealed and well-closed containers, as agreed to between the purchaser and the supplier.

## 6. MARKING

**6.1** The containers shall be marked with the following particulars:

- a) Name, type and grade of the material;
- b) Net mass in the container;
- c) Manufacturer's name and his recognized trade-mark, if any;
- d) Batch No. or lot No. in code or otherwise; and
- e) Month and year of manufacture.

**6.2** In addition, in the case of type and grades which are not suitable for direct edible use (namely, the semi-refined grade and raw grade of the solvent extracted type), the following information shall be suitably marked, either printed on the label affixed to the container or lithographed or stencilled thereon with indelible ink in a type size not less than 50 mm:

‘NOT FOR DIRECT EDIBLE CONSUMPTION’.

\*Specification for hexane, food grade.

†Methods of sampling and test for oils and fats: Part I Methods of sampling, physical and chemical tests (revised).

‡Methods of sampling and test for oils and fats: Part II Purity tests (second revision).



TABLE 1 REQUIREMENTS FOR SUNFLOWER OIL

( Clause 4.4 )

SL No.	CHARACTERISTIC	REQUIREMENT FOR TYPE						METHOD OF TEST, REF TO CL No. IN
		Expressed		Solvent-Extracted				
		Raw	Refined	Raw	Semi-refined	Refined		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
i)	Moisture and insoluble impurities, percent by mass, <i>Max</i>	0.25	0.1	0.5	0.25	0.1	5 & 6	
ii)	Colour in a 1-in cell on the Lovibond scale expressed as Y + 5R, not deeper than	20	5	25	10	5	13	
iii)	Refractive index at 40°C	← ----- 1.464 0 to 1.480 0 ----- →					10	
iv)	Saponification value	← ----- 188 to 194 ----- →					15	
v)	Iodine value ( Wijs )	← ----- 100 to 140 ----- →					14	
vi)	Acid value, <i>Max</i>	3.0	0.5	5.0	0.75	0.5	7	
vii)	Unsatifiable matter, percent by mass, <i>Max</i>	1.5	1.5	2.0	1.5	1.5	8	
viii)	Flash point, Pensky- Martens ( closed ), °C, <i>Min</i>	—	—	100	125	250	P : 21 ( 1970 ) of IS : 1448†	

of IS : 548  
( Part I ) -  
1964\*

\*Methods of sampling and test for oils and fats: Part I Methods of sampling, physical and chemical tests ( revised ).

†Methods of test for petroleum and its products: P : 21 Flash point ( closed ) by Pensky-Martens apparatus ( first revision ).

## 7. SAMPLING

**7.1** Representative samples of the material shall be drawn as prescribed under **3** of IS : 548 ( Part I )-1964\*.

## 8. TEST METHODS

**8.1** Tests shall be carried out in accordance with the methods prescribed in IS : 548 ( Part I )-1964\*, IS : 548 ( Part II )-1974† and IS : 1448 ( P : 21 )-1970‡, reference to which has been given in **4.2**, **4.3** and col 8 of Table 1.

**8.2 Quality of Reagents**— Unless specified otherwise, pure chemicals and distilled water ( *see* IS : 1070-1960§ ) shall be used in tests.

**NOTE** — ‘ Pure chemicals ’ shall mean chemicals that do not contain impurities which affect the results of analysis.

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\*Methods of sampling and test for oils and fats: Part I Methods of sampling, physical and chemical tests ( *revised* ).

†Methods of sampling and test for oils and fats: Part II Purity tests ( *second revision* ).

‡Methods of test for petroleum and its products: P: 21 Flash point ( closed ) by Pensky-Martens apparatus ( *first revision* ).

§Specification for water, distilled quality ( *revised* ).



# INDIAN STANDARDS

ON

## OILS AND FATS, AND RELATED MATERIALS

IS :

- 75-1973 Linseed oil, raw and refined ( *second revision* )
- 435-1973 Castor oil ( *second revision* )
- 542-1968 Coconut oil ( *second revision* )
- 543-1968 Cottonseed oil ( *second revision* )
- 544-1968 Groundnut oil ( *second revision* )
- 545-1968 *MAHUA* oil ( *second revision* )
- 546-1975 Mustard oil ( *second revision* )
- 547-1968 Sesame oil ( *second revision* )
- 548 ( Part I )-1964 Methods of sampling and test for oils and fats: Part I Methods of sampling, physical and chemical tests ( *revised* )
- 548 ( Part II )-1974 Methods of sampling and test for oils and fats: Part II Purity test ( *second revision* )
- 595-1956 Blown rape ( or mustard ) oil for use in lubricants
- 877-1971 Methods of sampling and test for activated carbon used for decolorizing vegetable oils and sugar solution
- 887-1968 Animal tallow ( *first revision* )
- 1035-1972 Methods of sampling and test for bleaching earths ( *second revision* )
- 1675-1971 Stearic acid, technical ( *first revision* )
- 1676-1960 Oleic acid, technical
- 1780-1961 Vegetable tallow
- 1796-1960 Crude glycerine and refined glycerine
- 1965-1971 Bleaching earth of Indian origin used for decolorizing vegetable oils ( *first revision* )
- 3448-1968 Rice bran oil ( *first revision* )
- 3470-1966 Hexane, food grade
- 3490-1965 Nigerseed oil
- 3491-1965 Safflower oil
- 3492-1965 *KARANJA* oil
- 3579-1966 Methods of test for oilseeds
- 4054-1966 Neatsfoot oil
- 4055-1966 Maize ( corn ) oil
- 4056-1966 Fish oil for leather industry
- 4088-1966 *KUSUM* oil
- 4115-1967 Methods for sampling of oilseeds
- 4276-1967 Solvent-extracted soyabean oil, refined
- 4277-1975 Sunflower oil ( *first revision* )
- 4427-1967 Grading for groundnut kernels for oil milling and for table use
- 4428-1967 Grading for mustard seeds for oil milling
- 4429-1967 Grading for sesame seeds for oil milling
- 4617-1968 Grading for linseed for oil milling
- 4618-1968 Grading for castor seeds for oil milling
- 4619-1968 Grading for *MAHUA* kernels for oil milling
- 4620-1968 Grading for cotton seeds for oil milling
- 4765-1975 *NEEM* kernel and depulped *NEEM* seed oil ( *first revision* )
- 5292-1963 Grading for safflower seeds for oil milling
- 5293-1969 Grading for nigerseeds for oil milling
- 5294-1969 Grading for *KUSUM* seeds for oil milling
- 5614-1970 Tobacco seed oil
- 5637-1970 Watermelon seed oil
- 5638-1970 Acid oil ( cottonseed and groundnut )
- 5686-1970 Code of practice for handling and storage of oilseeds
- 6220-1971 Grading for copra for table use and for oil milling
- 7375-1974 Salseed fat